

CPG Responses to February 13, 2018 NJDEP Comments on Lower Passaic Upper 9-Mile Interim Remedy Plan

Responses to NJDEP Technical Concerns

NJDEP Comment Number	NJDEP Technical Concern	CPG Response
1	<p>The proposed Remedial Action Objectives (RAOs) are <u>limited in scope</u> to only "reducing" contaminant levels in sediment and biota and "reducing" contaminant migration. These goals cannot be accepted at this time because, given the remedial history of this river (See General Comment 2), the RAOs for the next remedial action in this river must support prior actions and be directly linked to achieving acceptable risk levels for human health and ecological receptors under CERCLA.</p>	<p>The proposed RAOs (attached) for the Upper 9-Mile Interim Remedy (IR) were provided by the CPG to Region 2 on February 9, 2018. The revised RAOs are linked to achieving acceptable risk levels by eliminating the internal sources that inhibit recovery. Addressing the internal sources through the IR will accelerate natural recovery and will thereby support the attainment of acceptable risk levels. The proposed RAOs are specific to the Upper 9-Mile IR and were developed to ensure that there are objective criteria (i.e., at least a 90% reduction in 2,3,7,8-TCDD SWAC and a SWAC reduction of total PCBs below background) for the remedial design (RD). The proposed RAOs explicitly incorporate monitoring and feedback through the adaptive management process that will ensure that acceptable risk levels are met following the completion of the IR.</p>
2	<p>The <u>proposed RALs represent current CERCLA discharge conditions</u> - RALs for sediment hot spot removal were selected by assuming that the current contaminant load in the water column represents "background", so that it would represent the best that could be achieved, rather than a CERCLA discharge from legacy contaminated sediments. The proposed RALs represent current conditions in a highly contaminated, un-remediated river system. As a result, the proposed RALs cannot be accepted as they are not linked to achieving CERCLA-compliant risk-based goals and, in its current form, does not assure the success of the entire river cleanup.</p>	<p>The comment is not accurate. The proposed RALs are not predicated on the current contaminant load in the water column representing "background." Rather, they identify a threshold between sediments that have recovered to the levels found on depositing sediment and sediments recovering more slowly or not at all and constituting sources inhibiting recovery. By remediating these source areas, the IR is anticipated to reduce the water column particulate concentrations by about an order of magnitude after construction, leading to accelerated recovery.</p> <p>Targeting of areas in the upper 9 miles where (1) surficial sediment concentrations exceed the RALs and (2) areas</p>

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		<p>susceptible to erosion with elevated subsurface concentrations will be addressed by the IR. A robust post-construction monitoring program is a component of the IR. Monitoring and adaptive management requirements will determine whether acceptable risk levels are achieved; if not, then additional actions will be taken to ensure that remedial goals identified in a second ROD are attained.</p>
3	<p>The IR proposal does not include the use of risk-based remedial goals -While risk-based remedial goals may not be required for an interim remedy, given the specific conditions and stage of this river's cleanup, (see General Comment 2), the sediment and biota tissue remedial goals (RGs) used in the 8-Mile ROD should be considered in the development of this IR proposal. These RGs could be used as default RGs for the entire river until improved RGs are developed, if considered warranted. EPA has identified a similar concern and possible path forward for development of site-specific remedial goals for an interim remedy.</p>	<p>As stated in the comment, risk based remedial goals are not required for an IR. The CPG and EPA have discussed the requirement to establish final remedial goals for the 17-mile LPRSA following the IR, in a second Record of Decision.</p> <p>Moreover, based on the human health risk assessment, the COC concentrations that would meet EPA's acceptable risk range for fish tissue in the upper 9 miles are the same as those in the lower 8 miles. Sediment remedial goals are not warranted because they are not risk-based.</p> <p>To demonstrate, consider if fish tissue concentrations do not reach acceptable levels when a sediment goal is reached – it is unlikely that remedy would be considered successful based on attaining the sediment goal. Alternatively, if acceptable fish tissue levels were achieved when the sediment goals have not been achieved, it is unclear what additional action would be necessary. Thus, what matters is whether fish tissue levels have reached acceptable levels, and the upper 9 miles and lower 8 miles are consistent on this basis.</p>

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4	<p><u>Method for Determining Remedial Success</u> - The Department has concerns regarding the CPG's proposed SWAC application as described in the IR proposal. First, the area described for SWAC evaluation (RM 0-17, or river-wide) is considered too large and must be reduced, at a minimum, to the specific operable unit for which the IR proposal is intended to address, the upper 9 miles of the river. In addition, through future design sampling, it may be determined that even smaller areas for SWAC application are most appropriate, to address differing exposure scenarios in shoal and mudflat areas versus the channel. Second, the IR proposal lacks appropriate metrics for determining remedial success. Use of river-wide SWAC is described, but neither the derivation method nor benchmarks for comparison are provided. In addition, currently, success and codification of final clean-up goals appear to depend on matching model forecasts, and not on meeting risk-based goals.</p>	<p>The SWAC reduction goals in RAO 1 are not for the entire LPRSA, but rather apply to the reach from RM 8.3 to RM 15.0 where active remediation will occur under the Upper 9-mile IR. These SWAC reductions are a metric for the design of the IR and not a metric for remedy success. Remedy success in the Upper 9 miles will be evaluated based on post-remediation tissue and water column monitoring to determine if recovery is on a track to achieve acceptable risk levels. Adaptive management will ensure that acceptable risk levels are attained.</p>
5	<p><u>Model Uncertainties</u> - Conditions for modeling in the upper 9 miles are less understood, as compared to the lower 8 Miles of the river. However, rates of sediment burial, implying potential for recovery (with cleaner sediment), have been observed to be slower in the upper 9 miles of the river versus the lower 8 miles (Israelsson, Peter H., et.al., 2014). The CPG's use of site data and modeling for the IR proposal have not taken this into account. The data used by the CPG to support the IR proposal (CPG Upper 9-Mile Plan, Nov. 27, 2017, Figure 7) is not representative of the upper 9 miles of the river.</p>	<p>While uncertainties exist, the RI data and modeling are sufficient to develop a CSM, and to identify and evaluate remedial alternatives for the FS.</p> <p>The purpose of Figure 7 is to show natural recovery in areas subject to net deposition, not to imply that conditions in the upper 9 miles are represented by what has occurred in the lower 8 miles. Differences exist between the lower 8 and upper 9 patterns of erosion and deposition and are understood and accounted for in the CSM and in the technical basis for the IR. While deposition is less widespread in the upper 9 miles, depositional areas exist and can be identified. The data for the upper 9 miles show</p>

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		<p>that the areas of highest concentration that would not be targeted (those with 2,3,7,8-TCDD concentrations between 200 and 300 ppt) mostly have experienced net deposition. Moreover, areas of the upper 9 miles that are determined erosional with elevated subsurface concentrations are addressed by RAO 2.</p>
6	<p><u>Potential Impacts to IR Proposal Schedule</u> - Under the 17-Mile RI/FS project, there has been formal conflict resolution on issues central to the river's risk assessments and conceptual site model which has affected the site schedule. Although progress has been made, this situation should be taken into account since core elements of the IR proposal have not been identified (e.g., risk-based remedial goals, time to achieve same, and metrics for determining remedial success). A plan that lacks specificity could result in delay thus prolonging the advancement of this project.</p>	<p>EPA Region 2 and the CPG are working closely on an expedited schedule to complete the Upper 9-mile FS, which will form the basis upon which Region 2 will issue a ROD for the upper 9 miles of the LPRSA and subsequent remedial design and implementation will proceed.</p> <p>Specifically related to the Upper 9-Mile Plan, the CPG has received input from EPA and modified the proposed IR accordingly (e.g. extending the IR from RM 12.3 to RM 15, revised performance-based RAOs etc.). We anticipate frequent and intensive engagement with EPA throughout the development of the IR FS to refine the details of the IR FS evaluation, the framework for long-term monitoring and adaptive management.</p> <p>Further, the CPG delivered a final BHHRA, which was approved by EPA in 2017. The CPG and EPA worked closely throughout 2017 and early 2018 to complete and deliver the revised RI Report, revised BERA and the hydrodynamic, sediment transport, and chemical fate & transport models.</p>
7	<p><u>Approval of CPG's IR proposal in current form could impact EPA's defense of 8-Mile ROD</u> - The CPG have promoted a</p>	<p>The Upper 9-Mile IR is a standalone proposal designed to quickly address the areas of greatest risk in the upper 9</p>

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	<p>different view on aspects of the river's conceptual site model, which has been used to demonstrate opposition to the 8-Mile ROD. Through a letter in June 2014, the CPG expressed strong opposition to the 8-Mile ROD: "The proposed remedy is scientifically flawed and does not consider the significant volume of information developed, with regulatory oversight, by the RI/FS. Because of failing to integrate all available information, the proposed remedy's conceptual model does not accurately reflect the complex processes at work in the Passaic River. The scientific methods and analysis used to develop the Sustainable Remedy are more robust than those used to develop the bank-to-bank dredge." The Department's expressed concern is that approval of the CPG's IR proposal in current form, and without a commitment by the CPG to drop opposition to the 8-Mile ROD, could serve to call into question the basis for selection of the current 8-Mile ROD and leave it vulnerable to a future challenge by CPG utilizing EPA's own technical and scientific analysis and approval.</p>	<p>miles and better align the remedial action schedules for the two operable units of the LPRSA. EPA has the authority and multiple opportunities in the IR process to ensure the effectiveness of the IR including (1) modifying the remedial design based on the predesign investigation and (2) requiring additional remedial action if the post-remediation monitoring results do not show progress towards acceptable risk levels.</p> <p>Moreover, EPA frequently selects and implements different remedial actions for different operable units of a CERCLA site. The nature of the upper 9 miles differs greatly from the lower 8 miles, which warrants a different approach to remediation. The EPA documented the differences between the upper 9 miles and the lower 8 miles of the river in the March 2016 Lower 8.3-Mile ROD (e.g., Section 4.2, Pages 11-12) and February 2014 Remedial Investigation Report for the Focused Feasibility Study (e.g. Section 8, Pages 8-1 and 8-2).</p>

Responses to NJDEP Comments Related to USEPA OLEM Directive 9200.1-130, Jan. 17, 2017

OLEM Recommendation/NJDEP Comment	CPG Response
<p><u>OLEM Recommendation 5</u>: "Clearly describe risk reduction expectations by identifying the monitoring endpoints that will be used to evaluate achievement of all remedial action objectives"...</p>	<p>See responses to NJDEP Technical Concerns #1 and #3, above, regarding risk reduction and adaptive management objectives embodied in the revised RAOs for the Upper 9-Mile IR. As outlined in the Upper 9-mile Plan</p>

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<p><u>NJDEP Comment:</u> As described under Technical Comments above, the CPG's IR proposal is considered insufficient regarding goals and benchmarks for achieving risk-based remedial goals.</p>	<p>submitted to Region 2 on February 9, 2018, final risk-based cleanup goals will be established in the second ROD.</p> <p>The revised Upper 9-Mile Plan submitted to Region 2 on February 9, 2018 outlines the anticipated primary post-remedy monitoring metrics and triggers for further action under adaptive management. The Upper 9-Mile IR Feasibility Study will present projections of initial (post-construction) and long-term risk reduction following IR implementation. It will also present an adaptive management framework as an appendix that will further define proposed monitoring elements, performance metrics, and potential thresholds for evaluating the need to undertake further action in a second ROD. A detailed monitoring plan and adaptive management plan will be developed during remedial design.</p>
<p><u>OLEM Recommendation 6:</u> "Develop risk reduction expectations that are achievable by the remedial action."</p> <p><u>NJDEP Comment:</u> The CPG's IR proposal in its current form will not achieve sufficient risk reduction potentially available for this river because RALs were selected by assigning in-river contaminant load as "background", i.e., the best that could be achieved. Preferred approaches for RAL selection which are linked to risk-based goals exist, and should be developed for this project.</p>	<p>See response to NJDEP Technical Concern #2, above.</p>
<p><u>OLEM Recommendation 7:</u> "Consider the limitations of models in predicting future conditions for purposes of decision making."</p> <p><u>NJDEP Comment:</u> Models are wonderful tools but are imperfect; limitations of models must be acknowledged and accounted for in remedial decision-making. In addition to describing uncertainty of model</p>	<p>The CPG plans to develop and utilize the modeling for the Upper 9-Mile FS and the IR in full accordance with the OLEM recommendations and with EPA oversight.</p> <p>The IR and post-remediation monitoring program are specifically designed to account for the limitations of</p>

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<p>predictions, provisions for compensating for model limitations need to be considered and incorporated in designing remedial actions - - this will most often mean "to err on the side of caution" and add safety factors to achieve goals. The CPG's IR proposal in its current form does not appear to account for model limitations or include provisions for addressing same.</p>	<p>modeling by incorporating Adaptive Management into the IR. Models provide a means to estimate cause and effect. They integrate knowledge of a site within a construct constrained by basic laws such as conservation of mass and embodying scientific understanding of the physical, chemical and biological processes involved in COPC fate and bioaccumulation. Because our knowledge is incomplete, and the models approximately represent reality, models are best used to determine if it is reasonably likely that a desired outcome will be reached.</p> <p>Adaptive Management is decision-making despite residual uncertainty. Rather than erring "on the side of caution," Adaptive Management uses best estimates of cause and effect and the understanding that effects of the remedy must be monitored, that the monitoring will be used to refine our knowledge and that the remedial action may be adjusted as necessary based on that knowledge.</p>
<p><u>OLEM Recommendation 8</u>: ""Consider a structured adaptive management approach to response action implementation that includes using early actions, interim and contingency remedies."</p> <p><u>NJDEP Comment</u>: Within the Passaic river, three prior remedial actions exist: 2 completed and, the most comprehensive one, the 8-Mile ROD, in design. It is also important to note the emphasis on "structured" adaptive management, which is specified in USEPA's guidance to include the upfront establishment of measurable remedial action objectives (i.e., what levels are expected to be achieved in what media over what area, and in what timeframe?) followed by identification of specific trigger criteria that will be used to identify a need to change course, and a monitoring framework needed to support these evaluations. CPG's IR proposal in its current form lacks the necessary level of detail and structure to implement a successful adaptive management approach.</p>	<p>See response to NJDEP's comment regarding OLEM Recommendation 5, above.</p> <p>The CPG provided revised RAOs that include design requirements of 90% reduction in the sediment SWAC for 2,3,7,8-TCDD and a SWAC reduction below background for Total PCBs on February 9, 2018 in response to discussions with EPA.</p> <p>Responses to the Department's comments on adaptive management and performance are initially addressed in the Upper 9-Mile Plan (dated February 9, 2018) and will be more fully developed in the FS and RD, as the details for the structured adaptive management and performance monitoring program are determined.</p>

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**Proposed Remedial Action Objectives (RAOs) for the Upper 9-Mile Feasibility Study (FS) –
Dated February 9, 2018**

The Lower Passaic River Study Area (LPRSA) Remedial Investigation (RI) provides data and evaluations that demonstrate that remediation of ongoing sediment sources will result in significant risk reduction. However, as is common in recent RI/FS studies of complex river systems, an incomplete understanding of contaminant patterns and recovery processes leads to uncertainty in model projections and limits the ability to identify a final remedy for the Upper 9-Miles of the LPRSA with a sufficient level of confidence. Rather than extend the 17-Mile RI/FS and further delay the identification and selection of a final remedy, an interim remedy (IR) for source control is proposed to address areas that contribute to risk and are not sufficiently recovering. The implementation of a Source Control IR employing an adaptive management strategy that better characterizes and controls known source areas will accelerate the clean-up and recovery of the entire LPRSA and Newark Bay while obtaining the information necessary to determine whether additional actions are required to meet remedial goals.

Control of these source areas is expected to:

- Reduce exposure of human and ecological receptors to COCs within the LPRSA;
- Expedite natural recovery of sediment through the removal of sources located between RM 8.3 and RM15;
- Reduce resuspension of COCs into the water column; and
- Reduce COC transport to the Lower 8-Miles and Newark Bay.

The proposed RAOs for the source control IR are:

1. Control the principal sediment sources of 2,3,7,8-TCDD and Total PCBs, thereby attaining a 90% reduction in the 2,3,7,8-TCDD surface weighted average concentration (SWAC) and a reduction in Total PCB SWAC to below established background¹. Source areas are identified as those areas where sediment concentrations in the top six (6") inches exceed remedial action levels (RALs)² between RM 8.3 and RM 15. To the extent that controlling these source areas do not attain the SWAC reduction targets, additional areas will be remediated to achieve the target SWAC reductions.

¹ Post Source Control IR SWAC concentrations for Total PCBs are estimated to be below background concentrations established in the OU-2 FFS for the lower 8.3 miles.

² Initial Remedial Actions Levels (RAL) are proposed as 300 ng/kg of 2,3,7,8-TCDD and 1 mg/kg of Total PCBs for the Feasibility Study and will be re-evaluated during the Remedial Design.

2. Control the potential exposure of additional subsurface sources of 2,3,7,8-TCDD and Total PCBs by remediating surface sediments between RM 8.3 and RM 15 with a demonstrated potential for net erosion and shallow subsurface sediment concentrations (6-18 inches below the surface) that exceed the RALs.
3. Following implementation of the IR, monitor to confirm that post-remedial recovery is progressing towards achieving expectations for tissue concentrations and apply adaptive management to identify additional response actions, if needed to achieve acceptable risk

The final footprint designed to achieve RAO 1 will be established in the Remedial Design following the Pre-Design Investigation (PDI). A high-density sediment sampling program (e.g., 80 feet on center triangular grid) is contemplated for the PDI. These data will be used to calculate pre- and post-remediation SWACs for 2,3,7,8 TCDD and Total PCBs. Initial RALs of 300 ng/kg for 2,3,7,8 TCDD and 1 mg/kg for Total PCBs will be evaluated to determine if removal of surficial sediment with concentrations above these RALs will attain RAO 1. If the objective of 90% reduction in 2,3,7,8-TCDD surficial sediment SWAC and Total PCB surficial SWAC below background is achieved or exceeded, the Remedial Design will be based on these RALs. If the removal of surficial sediment with concentrations in excess of 300 ng/kg for 2,3,7,8 TCDD and 1 mg/kg for total PCBs does not result in the SWAC reduction objective, then the RALs will be modified to refine the remedial footprint to achieve RAO 1. Once sufficient reduction in the SWAC to meet RAO 1 has been established, the Remedial Design will proceed using the resulting remedial footprint.

RAO 2 addresses areas that have a reasonable likelihood of impacting recovery via erosion but are not targeted through RAO 1. These areas have the following characteristics: 1) there is a reasonable likelihood that erosion would expose sediments now 6 to 18 inches below the sediment surface; and 2) those sediments have a 2,3,7,8-TCDD concentration in excess of 300 ng/kg or a Total PCB concentration greater than 2 mg/kg³. To address this RAO, the PDI sampling described under RAO 1 will include subsurface sediment sampling (e.g., 0-1", 1-6" and 6-18" below the surface). Erosion potential will be assessed based on observed bathymetric changes, in the manner presented in the Remedial Investigation Report, and through high resolution hydrodynamic modeling of high flow event shear stresses conducted during Remedial Design coupled with erosion parameters established for the LPRSA sediment transport modeling. The RAO 2 footprint will be combined with the RAO 1 footprint for the final IR footprint used for the Remedial Design.

RAO 3 addresses the LPR's response to implementation of the IR and if the river is recovering as predicted by the conceptual site model. The chemical fate and transport and the bioaccumulation models will be refined with data obtained during the PDI. During the Remedial Design, the models will be used to develop expected recovery curves for the river.

³ The Total PCB threshold concentration is set above the Total PCB RAL of 1 mg/kg in recognition that erosion has less ability to impact recovery than for 2,3,7,8-TCDD because of the importance of external PCB sources in controlling recovery.

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Post-remediation monitoring data will be collected for the primary COCs driving risk and will be compared with the conceptual site model and evaluated relative to the recovery curves generated by the bioaccumulation model to determine if the river is progressing toward acceptable risk levels at the expected rate. If the data indicate that the river is not recovering as rapidly as projected, then a diagnostic assessment will be performed and additional response actions will be developed.